

Application No.: 10/623,833  
Attorney Docket No.: 22177-0023

### C.) AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions, and listings of claims in the Application.

1. (Currently Amended) A dental x-ray diagnostic apparatus for performing real-time digital radiography in Cephalography of a patient skull, the apparatus comprising:

a base frame arrangement; for supporting the apparatus;  
a sliding frame configured to move vertically along the base frame and the sliding frame being moved by an independent actuator under microcomputer control;  
a rotary frame coupled to the base frame arrangement, sliding frame by a cinematic unit,  
and the rotary frame supporting an x-ray source at one end, and an x-ray imager at the other end;

a cinematic unit connecting the rotary frame and the base frame arrangement, the cinematic unit being configured to execute orbital roto-translational movements of the rotary frame, x-ray source and the x-ray imager around the patient skull, wherein the orbital roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane, and the orbital roto-translational movements of the rotary frame x-ray source and the x-ray imager being driven by independent actuators in the cinematic unit controlled by data supplied from a microcomputer;

an x-ray imager disposed in a Cephalographic position, the x-ray imager being movable during a scanning operation by an independent actuator; and

wherein the roto-translational movements of the cinematic unit permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation.

2. (Currently Amended) The apparatus as set forth in claim 1 wherein the second x-ray imager has an active area of a size approximately equivalent to a conventional radiographic film.

3. (Currently Amended) An apparatus as in claim 1, further comprising a second x-ray imager,

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the second x-ray imager being supported by the rotary frame and disposed opposite the x-ray source in a Panoramic position.

4. (Currently Amended) The apparatus as set forth in claim 3, 1 wherein the predefined virtual center of irradiation is located at the focal point of the x-ray source, said second x-ray imager has a linear shaped active area of a size less than a conventional radiographic film.

5. (Currently Amended) The apparatus as set forth in claim 3, 1 wherein said ~~second~~ x-ray imager is associated with a horizontal scanning movement, and has a linearly shaped active area oriented vertically with a height substantially greater than a width.

6. (Currently Amended) The apparatus as set forth in claim 3, 1 wherein said ~~second~~ x-ray imager is associated with a horizontal scanning movement, and is ~~provided with an independent active actuator capable of performing a linear translation of said second x-ray imager~~ linearly translated during a scanning movement under ~~by computer control of the independent actuator for the x-ray imager.~~

7. (Currently Amended) The apparatus as set forth in claim 3, 1 wherein said ~~second~~ x-ray imager is associated with a vertical scanning movement, and has a linearly shaped active area oriented horizontally with a width substantially greater than a height.

8. (Currently Amended) The apparatus as set forth in claim 3, 1 wherein said ~~second~~ x-ray imager is associated with a rotational scanning movement, and has a linearly shaped active area for use with a narrow x-ray beam.

9. (Currently Amended) The apparatus as set forth in claim 3, 1 wherein said ~~second~~ x-ray imager is associated with a vertical, or horizontal, or rotational scanning movement, and an x-ray beam is collimated by a collimator intercepting the x-ray beam before a patient and in proximity of the patient, which is provided with an independent active actuator capable of performing the

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linear or rotational translation of the collimator during a scanning movement under computer control.

10. (Previously presented) The apparatus as set forth in claim 1, comprising a collimator operated by independent active actuators under microcomputer control, allowing resizing of an x-ray field to any desired format required for a chosen radiographic modality as well as a translation of the x-ray field during a vertical or horizontal or rotational scanning process.

11. (Currently Amended) The apparatus as set forth in claim 3 1 wherein a mechanism is given providing relocation of said ~~second~~ x-ray imager selectively between a Cephalographic and a Panoramic position.

12. (Original) The apparatus as set forth in claim 11 wherein such mechanism comprises a telescopic arm providing relocation either manually or automatically by an independent actuator under microcomputer control upon user command.

13. (Original) The apparatus as set forth in claim 11 wherein such mechanism comprises a folding arm providing relocation either manually or automatically by an independent actuator under microcomputer control upon user command.

14. (Original) The apparatus as set forth in claim 11 wherein such mechanism comprises a detachable connector allowing in a secure and ergonomic way the manual connection and disconnection of the x-ray imager selectively between the Cephalographic and the Panoramic position.

15. (Previously presented) The apparatus as set forth in claim 1 wherein a patient positioning system used in Cephalography is provided with independent active actuators by which the patient positioning system can be translated relative to a corresponding support frame in order to maintain a firm patient position during a horizontal or vertical scanning process where a

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movement of the support frame is involved.

16. (Currently Amended) A method for operating a dental x-ray diagnostic apparatus performing real-time digital radiography in Cephalography, comprising the steps of:

positioning a patient by a patient positioning system;

irradiating a patient skull ~~from a predefined virtual center of irradiation of an x-ray source~~  
during ~~an orbital~~ a roto-translational movement of ~~an~~ a rotary frame supporting the x-ray  
source and a linear movement of an x-ray imager positioned in a Cephalographic position;

performing acquisition of image data by the x-ray imager and digital processing of the image data for reconstruction of a diagnostic image; and

wherein the ~~orbital movement~~ roto-translational movements of the rotary frame x-ray  
source and the x-ray imager include being capable of one rotational movement and two  
transverse linear movements in a horizontal plane, and the ~~orbital~~ roto-translational  
movements of the rotary frame x-ray source and the x-ray imager being driven by independent actuators in the cinematic unit controlled by data supplied from a microcomputer.

17. (Canceled)

18. (Currently Amended) A method for operating a dental x-ray diagnostic apparatus performing real-time digital radiography in cephalography, comprising the steps of:

aligning an x-ray source with an x-ray imager, either manually or automatically, wherein,  
the step of aligning the x-ray source with an x-ray imager includes the step of relocating the  
x-ray imager from a Panoramic position to a Cephalographic position with one of a manual  
mechanism or an automatic mechanism;

positioning a patient by a patient positioning system;

setting a collimator to provide a narrow x-ray beam laying in a vertical plane;

starting a scanning process during which the x-ray beam is linearly translated through a patient skull in a horizontal (Y) direction by a coordinated ~~horizontal~~ simultaneous and linear

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movement of the x-ray source and the x-ray imager in the horizontal direction under computer control; and

performing acquisition of image data by the x-ray imager, and computer processing for reconstruction of a diagnostic image, inclusive of correction of a magnification distortion in the horizontal direction.

19. (Canceled)

20. (Currently Amended) A method for operating a dental x-ray diagnostic apparatus performing real-time digital radiography in cephalography, comprising the steps of:

aligning an x-ray source with an x-ray imager, either manually or automatically, wherein the step of aligning the x-ray source with an x-ray imager includes the step of relocating the x-ray imager ~~imager, either manually or automatically,~~ from a Panoramic position to a Cephalographic Cephalographic position with one of a manual mechanism or an automatic mechanism;

positioning a patient by a patient positioning system;

setting a collimator to provide a narrow x-ray beam laying in a vertical plane;

starting a scanning process during which the x-ray beam is linearly translated through a patient skull in a horizontal (Y) direction by a coordinated horizontal movement of the collimator and the x-ray imager under computer control, while the x-ray source is fixed in position; and

performing acquisition of image data by the x-ray imager, and computer processing for reconstruction of a diagnostic image.

21. (Currently Amended) A method for operating a dental x-ray diagnostic apparatus performing real-time digital radiography in cephalography, comprising the steps of:

aligning an x-ray source with an x-ray imager, either manually or automatically, wherein the step of aligning the x-ray source with an x-ray imager includes the step of relocating the x-ray ~~imager imager, either manually or automatically,~~ from a Panoramic position to a

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Cephalographie Cephalographic position with one of a manual mechanism or an automatic mechanism;

- positioning a patient by a patient positioning system;
- setting a collimator to provide a narrow x-ray beam laying in a horizontal plane;
- starting a scanning process during which the x-ray beam is linearly translated through a patient skull in a vertical (V) direction by a coordinated vertical movement of the x-ray source and the x-ray imager under computer control; and
- performing acquisition of the image data by the x-ray imager, and computer processing for the reconstruction of the diagnostic image, inclusive of correction of the magnification distortion in the ~~horizontal~~ vertical direction.

22. (Currently Amended) A method for operating a dental x-ray diagnostic apparatus performing real-time digital radiography in cephalography, comprising the steps of:

- aligning an x-ray source with an x-ray imager, either manually or automatically, wherein the step of aligning the x-ray source with an x-ray imager includes the step of relocating the ~~x-ray imager imager, either manually or automatically,~~ from a Panoramic position to a Cephalographie Cephalographic position with one of a manual mechanism or an automatic mechanism;

- positioning a patient by a patient positioning system;
- setting a collimator to provide a narrow x-ray beam laying in a horizontal plane;
- starting a scanning process during which the x-ray beam is linearly translated through a patient skull in a vertical (V) direction by a coordinated vertical movement of the collimator and the x-ray imager under computer control, while the x-ray source is fixed in position; and
- performing acquisition of image data by the x-ray imager, and computer processing for reconstruction of a diagnostic image.

23. (Currently Amended) A method for operating a dental x-ray diagnostic apparatus performing real-time digital radiography in cephalography, comprising the steps of:

- aligning an x-ray source with an x-ray imager, either manually or automatically;

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positioning a patient by a patient positioning system;  
setting a collimator to provide a narrow x-ray beam;  
starting a scanning process during which the x-ray beam is rotationally translated about a horizontal axis through a patient skull by a coordinated rotational movement of the collimator and the x-ray imager under computer control, while the x-ray source is fixed in position; and  
performing acquisition of image data by the x-ray imager, and computer processing for reconstruction of a diagnostic image.